WATER MONITORING STATION

DATASHEET

Document Release Information

Persons in Charge		Document Information	
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GPS Module	Embedded
Water Monitoring Sensor Options:	Water Level Radar Sensor
	Water Velocity Radar Sensor
	Water Temperature Sensor
	Water Quality Sensors (avail. H1 2022)
Environmental Sensing Sensor Options:	Temperature, Humidity, Pressure Sensor
	Wind Speed Sensor
	Wind Direction Sensor
	Advanced Precipitation Sensor (with heating)
	Precipitation Sensor
Station Connectivity Options	2G/3G
	LoRaWAN
	NB-IoT
Power Supply (all included by default)	Power Grid (110V/220V)
	Solar Panel – 20W / 100W
	Embedded UPS
Protection Level	IP65, for outdoor mounting
Operating Temperature	- 30°C ~ + 70°C

Table 1: Water Monitoring Station Brief Specification

Key facts:

- Simultaneously monitors both watercourse and ambient environment parameters;
- Industrial-grade IP65 bodies, able to withstand all weather conditions;
- Operates autonomously with no need of access to the power grid;
- Utilizes modular design, permitting sensor upgrades, updates and add-ons;
- Fast and easy to install, maintain, and support;
- Provides effortless multi-platform integration using standard protocols.
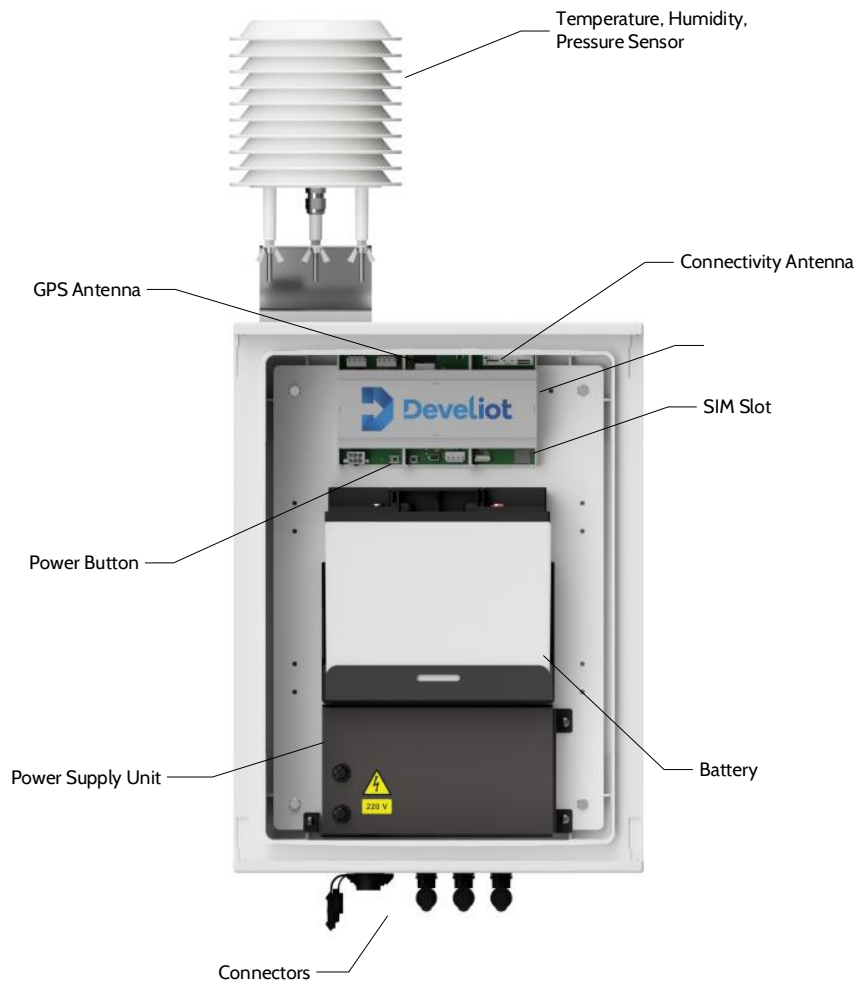
2. Station Overview

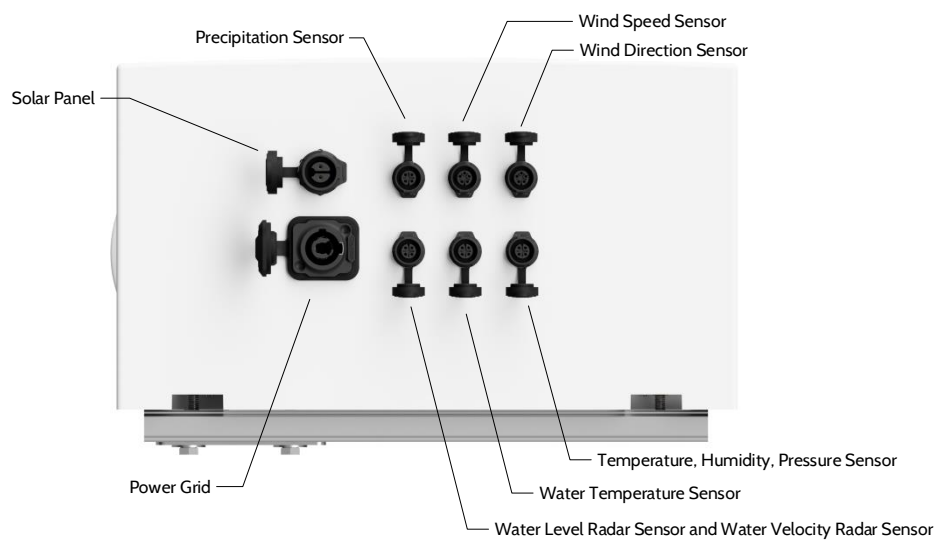Figure 1: Internal Overview of the Water Monitoring Station

Figure 2: Bottom View of the Water Monitoring Station

Figure 3: Water Monitoring Station with Water Level Radar Sensor, Water Velocity Radar Sensor, Advanced Precipitation Sensor, and Temperature, Humidity and Pressure Sensor

3. Main Body

The Station's Main Body consists of a glass filled polyester, robust, waterproof IP65 body designed for quick outdoor deployment on streetlamp posts, masts, building fronts, etc.

The Main Body is shielding the Computing Module and the Power Distribution Components.

The specification of the Main Body is the following:

Parameter	Value
Main Body Dimensions (H x W x L)	430 mm x 325 mm x 185 mm
Material	Glass filled polyester
Protection Level	IP65, for outdoor mounting

Table 2: Main Body Specification

3.1. Compute Module

The Compute Module manages the operation of the Water Monitoring Station. It gathers and transmits all sensor data, tracks GPS coordinates, and monitors various parameters related to the health status of the Station.

The specification of the Main Controller is the following:

Parameter	Value
Operating Temperature	- 30°C ~ + 70°C
Connectivity Options	2G
	LoRaWAN
	NBIoT
Connectivity Options for On-Site Diagnostics	WiFi
GPS Module	Embedded

Table 3: Main Controller Specification

3.2. Power Sources

The Water Monitoring Station embeds three power sources to ensure flexibility of installation and reliability during severe weather conditions.

The specification of the Station's Power Sources is the following:

Parameter	Value
Power Grid Compatibility	110 / 220 VAC
Solar Panel Capacity	20W or 100 W
UPS Battery Capacity	1 x 12VDC 12Ah or 2 x 12 VDC, 12 Ah

Table 4: Power Sources Specification

The average life of the internal UPS battery without recharging is:

- 20 (twenty) days for stations without Advanced Precipitation Sensor (with heating);
- 2 (two) days for stations with Advanced Precipitation Sensor (with heating).

4. Sensors and Sensor Modules

4.1. Specification of Water Level Radar Sensor

The Water Level Radar Sensor adopts a radar-based distance measurement system working between 60GHz and 64GHz. It provides distance measurement with millimeter accuracy.
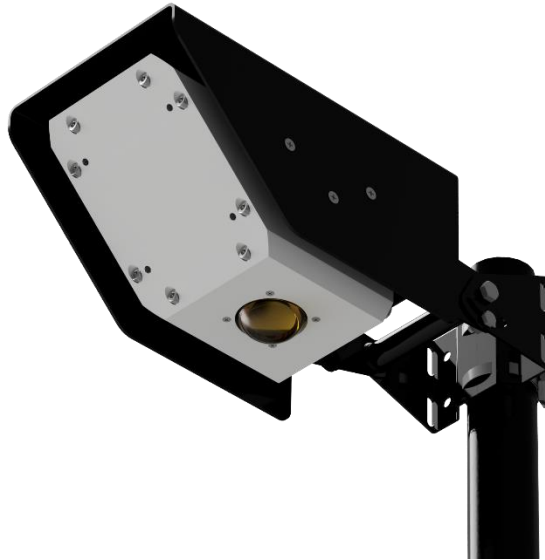
Figure 4: Water Level Radar Sensor

Parameter	Value
Target Parameter	Water Level
Detection Range	0.40 ~ 40 m
Resolution	0.1 cm
Accuracy	±1%
Storage Temperature	-40°C ~ +85°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	-40°C ~ +85°C
Operating Humidity	0 ~ 100% RH
Size:	220 mm x 120 mm x 120 mm
Protection Level	IP65, for outdoor mounting

Table 5: Specification of Water Level Radar Sensor

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4.2. Specification of Water Velocity Radar Sensor

The Water Velocity Radar Sensor adopts a radar-based motion detector system in the 24GHz - ISM – Band. The sensor can detect moving object in a distance from 0.3 to 150 m (depending on RCS of detected object).
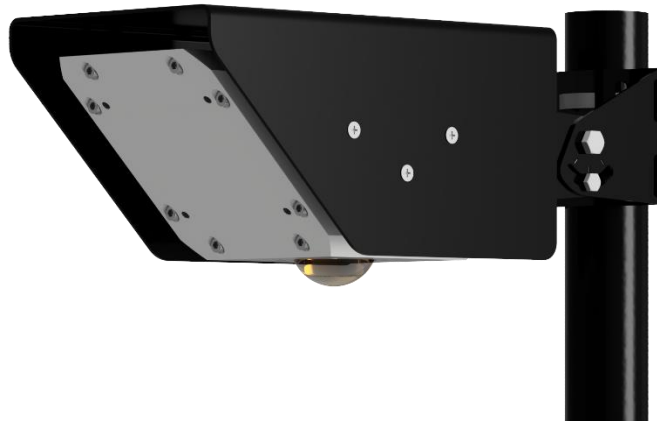
Figure 5: Water Velocity Radar Sensor

Parameter	Value
Target Parameter	Water Velocity
Detection Range	0.2 ~ 70 m/s
Resolution	0.01 m/s
Accuracy	±0.1 m/s
Storage Temperature	-25°C ~ +60°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	-25°C ~ +60°C
Operating Humidity	0 ~ 100% RH
Size	220 mm x 120 mm x 120 mm
Protection Level	IP65, for outdoor mounting

Table 6: Specification of Water Velocity Radar Sensor

4.3. Specification of Water Temperature Sensor

The Water Temperature Sensor is designed to be completely submergible under water to ensure accurate and consistent sensor readings. The sensor is positioned in a thermally conductive metal body.

Figure 6: Water Temperature Sensor

Parameter	Value
Target Parameter	Water Temperature
Detection Range	-20°C ~ +50°C
Resolution	0.0078°C
Accuracy	±0.1°C
Storage Temperature	-40°C ~ +80°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	-20°C ~ +50°C
Operating Humidity	0 ~ 100% RH
Size	120 mm x 35 mm x 35 mm
Protection Level	IP68, for outdoor mounting

Table 7: Specification of Water Temperature Sensor

4.4. Specification of Wind Speed Sensor

The Wind Speed Sensor adopts a three-wind cup structure produced of ABS material with very high strength. The sensor comes with great resolution, which enables the speed detection to be triggered from very low speed air masses.

Figure 7: Wind Speed Sensor

Parameter	Value
Target Parameter	Wind Speed
Detection Range	0 ~ 45 m/s (0 ~ 162 km/h)
Resolution	0.1 m/s
Accuracy	0.5 m/s
Response Time	<1 sec
Storage Temperature	-20°C ~ +80°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	-20°C ~ +80°C
Operating Humidity	0 ~ 100% RH
Size	Ø 180 mm x 158 mm
Protection Level	IP54, for outdoor mounting

Table 8: Specification of Wind Speed Sensor

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4.5. Specification of Wind Direction Sensor

The Wind Direction Sensor adopts a precise internal angle sensor and low inertia ABS vane response for wind direction.

Figure 8: Wind Direction Sensor

Parameter	Value
Target Parameter	Wind Direction
Detection Range	0 ~ 359°
Resolution	1°
Accuracy	3°
Response Time	<1 sec
Storage Temperature	-20°C ~ +60°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	-20°C ~ +60°C
Operating Humidity	0 ~ 100% RH
Size	Ø 223 mm x 190 mm
Protection Level	IP54, for outdoor mounting

Table 9: Specification of Wind Direction Sensor

4.6. Advanced Precipitation Sensor Bucket

The Precipitation Sensor rain gauge is an instrument used to measure rainfall. It is designed and constructed for long-term operation with minimal maintenance under almost all climatic conditions. All materials used are corrosion resistant.

Figure 9: Advanced Precipitation Sensor

Parameter	Value
Target Parameter	Rain, Precipitation
Detection Range	0.10 mm, 0.20 mm, 0.50 mm
Resolution	0.10 mm
Accuracy	± 3% over 25 mm/hr to 100 mm/hr
Response Time	<1 sec
Storage Temperature	-10°C ~ +60°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	-10°C ~ +50°C
Operating Humidity	0 ~ 100% RH
Size	315 mm x 315 mm x 420 mm
Protection Level	IP54, for outdoor mounting

Table 10: Specification of Advanced Precipitation Sensor

4.7. Precipitation Sensor Bucket

The Precipitation Sensor adopts a precise self-emptying tipping bucket. Meteorological patented unique single spoon tipping bucket is one of the most accurate and reliable automatic rain gauges on the market. As an accessory a leaf grid with bird spikes can be provided.

Figure 10: Precipitation Sensor

Parameter	Value
Target Parameter	Rain, Precipitation
Detection Range	0.10 mm, 0.20 mm, 0.25 mm, 0.50 mm
Resolution	0.10 mm
Accuracy	±2%
Response Time	<1 sec
Storage Temperature	-20°C ~ +80°C
Storage Humidity	0 ~ 100% RH
Operating Temperature	0°C ~ +60°C
Operating Humidity	0 ~ 100% RH
Size	Ø 200 mm x 255 mm
Protection Level	IP54, for outdoor mounting

Table 11: Specification of Precipitation Sensor

4.8. Specification of Temperature, Humidity, Pressure Sensor

The Temperature, Humidity, Pressure Sensor is enclosed in a specially designed protective shield located over the Main Body. The Sensor's protective shield ensures constant natural air convection in order to achieve accurate and consistent sensor readings.
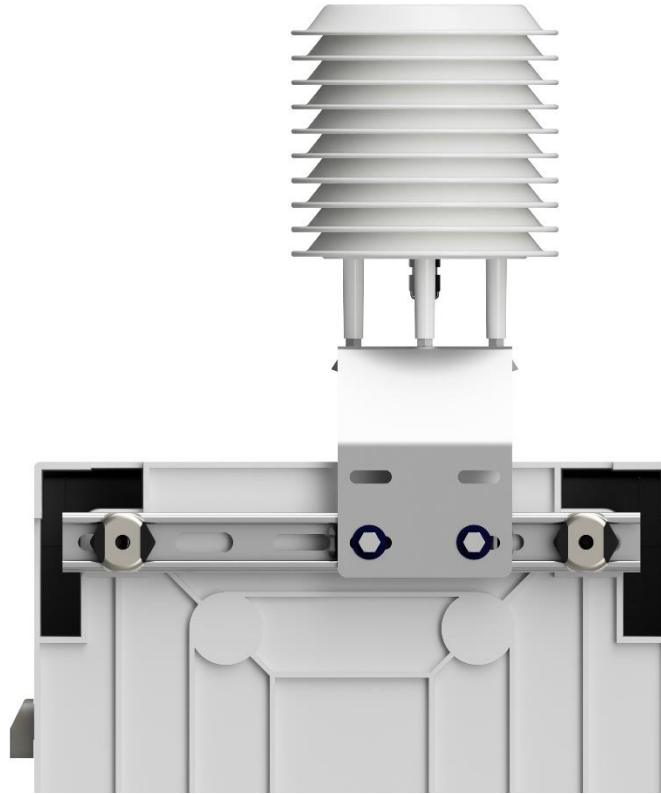

Figure 11: Temperature, Humidity, Pressure Sensor Mounted on The Station

Parameter	Value
Target Parameters	Temperature
	Humidity
	Pressure
Detection Range – Temperature	-40 ~ 80°C
Detection Range – Humidity	0 ~ 100% RH
Detection Range - Pressure	300 ~ 1100 hPa
Resolution – Temperature	0.0078°C
Resolution – Humidity	0.008 %RH
Resolution – Pressure	0.0018 hPa
Accuracy – Temperature	0.1°C
Accuracy – Humidity	3%
Accuracy – Pressure	1.5 hPa
Response Time	1 sec
Storage Temperature	-40 ~ 80°C
Storage Humidity	0 ~ 100% RH

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Storage Pressure	0 ~ 2000 hPa
Operating Temperature	-40 ~ 80°C
Operating Humidity	0 ~ 100% RH
Operating Pressure	300 ~ 1100 hPa
Size	59 mm x 59 mm x 11 mm
Size with Shield	370 mm x 140 mm x 170 mm

Table 12: Specification of Temperature, Humidity, Pressure Sensor

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